REMARKS

Claims 1-4 and 6-10 are pending in the application.

Claims 1-4 and 6-10 are rejected under 35 U.S.C. 103(a).

Claim 4 is amended.

No new matter is added.

Applicants request reconsideration and allowance of the claims in light of the above amendments and following remarks.

Claims Rejection – 35 USC § 103

Claims 1-3 and 7-9 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over U.S. Patent No. 6,043,9290 issued to Delaveaux in view of U.S. Patent No. 5,555,127 issued to Abdelkader, et al. (hereinafter "Abdelkader"). Applicants respectfully traverse this rejection.

Claim 1 recites, among other elements, "a light source disposed above the gain medium structure for pumping the gain medium structure by means of light directed downward therefrom." The Office Action asserts that this element is taught by Delaveaux because FIGS. 3 and 4 of Delaveaux allegedly show wherein "[t]he gain medium is exited by absorbing pump light at wavelength λ_p, which is incident from below on the larger area portion (40) of the gain medium." Applicants respectfully disagree.

Specifically, FIGS. 3 and 4 of Delaveaux illustrate plan views of side-pumping adiabatic waveguide amplifiers. See Delaveaux, column 2, lines 41-44. As shown in FIG. 3, the pump light having the predetermined wavelength λ_p is incident from side of the waveguide 62 on the endface 66 thereof. Applicants respectfully submit that the structure shown in FIG. 3 is a typical example of an optical side-pumping mechanism and it is the reason why the phrase "side-pumping" is used in the "Brief Description of the Drawings" section and especially in the description of FIGS. 3 and 4. Referring to FIG. 2 of Delaveaux, a pump signal P_1 and information signal S are both incident on a same input port 46 of amplifier 30, where input port 46 is defined as the endface of first single mode region 36 (or waveguide 34). In this case, the amount of pump signal P_1 entering through the input port 46 decreases because of the input of information signal S, which means lowered pumping efficiency. Referring to FIGS. 3 and 4 of

Delaveaux, pump signal P_1 and information signal S are incident on different input ports, and there is no problem as in the case of FIG. 2. However, FIGS. 3 and 4 of Delaveaux require an additional waveguide to enable optical pumping (e.g., waveguides 62 and 72), which complicates the devices shown therein. The disadvantages of the devices disclosed in Delaveaux are described at page 2, lines 3-16 of the specification as originally filed. However, by "pumping the gain medium structure by means of light directed downward therefrom" as recited in claim 1, the strength of the light is prevented from becoming reduced. See, e.g., page 5, lines 22-25 of the specification as originally filed.

For at least the reasons presented above, Applicants respectfully submit that Delaveaux fails to teach or suggest "a light source disposed above the gain medium structure for pumping the gain medium structure by means of light directed downward therefrom" as recited in claim 1. Accordingly, Applicants submit that claim 1 is not rendered obvious by the combination of Delaveaux in view of Abdelkader. See M.P.E.P. § 2143.03.

Claims 2, 3 and 7-9 depend from claim 1 and, therefore, include each and every element recited in claim 1. Accordingly, Applicants respectfully submit that claims 2, 3 and 7-9 are not rendered obvious by the combination of Delaveaux in view of Abdelkader for at least the reasons presented above with respect to claim 1.

Further, claim 2 recites wherein the top-pumped optical device includes "an upper cladding layer ... made of a material which transmits the light irradiated from the pumping light source." The Office Action asserts that this element is taught by Delaveaux because Delaveaux allegedly discloses a "cladding layer [that] transmits the light irradiated from the pumping light source." Applicants respectfully disagree.

For example, column 4, lines 14-16 of Delaveaux states that "[a]mplifier 60 ... is disposed on optical substrate 64." As shown in, for example, FIG. 3, the amplifier 60 of Delaveaux includes a waveguide 62 "used to support the pump signal ... [and] intersect[s] with [the] large area multimode region 40." See Delaveaux, column 4, lines 14-17. In view of the above, it can be reasonably understood that Delaveaux teaches wherein the waveguide 62 of amplifier 60 is made of a material which transmits light irradiated from a pumping light source. Delaveaux, however, is silent as to any discussion regarding cladding layers or the functional interaction between cladding layers and the amplifiers disclosed therein. As such, Delaveaux cannot be read to teach or even suggest wherein any of the optical devices disclosed therein

include a cladding layer is made of a material "which transmits the light irradiated from the pumping light source" as recited in claim 2. For at least this additional reason, Applicants submit that claim 2 is not rendered obvious by the combination of Delaveaux in view of Abdelkader. See M.P.E.P. § 2143.03.

Claims 4, 6 and 10 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Delaveaux in view of Abdelkader and further in view of U.S. Patent No. 6,698,246 issued to Beall, et al. (hereinafter "Beall"). Applicants respectfully traverse this rejection.

Claims 4 and 6 depend from claim 1 and, therefore, include each and every element recited in claim 1. Additionally, elements recited in claim 10 are similar to those recited in claim 1. As established above, the combination of Delaveaux in view of Abdelkader does not render claim 1 obvious. Beall does not cure the above-discussed deficiency of Delaveaux in view of Abdelkader. Accordingly, Applicants respectfully submit that claims 4, 6 and 10 are not rendered obvious by the combination of Delaveaux in view of Abdelkader and Beall for at least the same reasons presented above with respect to claim 1.

Further, claim 4 recites "wherein the gain medium is made of ... a silica-based substance doped with excited elements and nano-crystals" and claim 10 recites "wherein the gain medium is made of a silica-based substance doped with rare-earth elements and nano-crystals." The Office Action asserts that these elements are taught by Beall because Beall allegedly discloses "[a] nanocrystal and lanthanide element doped glass-ceramic." Applicants respectfully disagree.

Specifically, Beall discloses producing a nanocrystalline glass-ceramic that is doped with at least one kind of optically active ion (such as a transition metal or lanthanide element (rare-earth element)) which is dispersed in a glass matrix that forms the core of an optical fiber (see Abstract). In other words, the glass-ceramic nanocrystals include excited elements (rare earths) and simply act as a local host for excited elements (rare-earths). Claims 4 and 10, however, recite wherein the gain medium is a silica-based substance that is doped with both rare-earth elements (excited elements) and nano-crystals. Applicants respectfully submit that one of ordinary skill in the art will appreciate that nano-crystals absorb pumped photon whose energy exceeds its bandgap and subsequently transfer the energy to the rare-earths (excited elements).

Accordingly, the nano-crystals recited in claims 4 and 10 act as broadband sensitizers, not as a host as in Beall.

For at least the additional reasons presented above, Applicants respectfully submit that none of Delaveaux, Abdelkader, or Beall, singly or in combination, teach or suggest each and every element recited in claims 4 and 10 and, therefore, fail to render these claims obvious. See M.P.E.P. § 2143.03.

CONCLUSION

For the foregoing reasons, Applicants request reconsideration and allowance of claims 1-4 and 6-10 of the application as amended. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

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